

PATENT
Serial No. 09/989,605
Attorney Docket No. 9A01.1-100

REMARKS

Status of Claims

Claims 1, 4, 5, 34, 48 and 54 have been amended. Claims 6, 10, 11, 36 and 37 have been canceled. Claims 1, 2, 4, 5, 8, 9, 12-35, 38-52 and 54 remain pending in this application following amendment, claims 3, 7 and 53 having been previously canceled. The Applicants respectfully request further examination of the application, as amended.

Claims Allowed

Claims 16-30, 34-40 and 42-47 have been allowed by the Examiner. The Applicants wish to thank the Examiner for recognizing the allowability of these claims.

Objections to the Claims

Claims 11-15, 39-47, 49-52 and 54 have been objected to by the Examiner as depending from rejected base claims but allowable in independent form. The Applicants have incorporated the subject matter of some of these claims into the claims from which they depend in order to provide a claim in allowable form, as discussed below. With regard to other claims, the Applicants have amended them in other ways and/or traverse the rejection, as discussed below.

Claim 54 has also been objected to by the Examiner as erroneously depending from a rejected claim. The Applicants have amended claim 54 to correct this informality, as it was intended to depend from claim 48.

Rejection of Claims 1-3 under 35 USC §103(a) – Olgaard

Claims 1, 2 and 4 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Olgaard* (U.S. Patent No. 6,683,919 to Olgaard, et al.). The Applicants have amended independent claim 1 to incorporate limitations regarding the I/Q sampler structure.

Claim 1, as amended, now further recites that in the I/Q sampler a delay element delays one of the in-phase and quadrature phase components of the sampled signal, and an adder receives the delayed component and the un-delayed component to

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produce an input to the quantizer. The Applicants respectfully disagree that *Olgaard* discloses or suggests an I/Q sampler having these limitations. Nowhere in *Olgaard* is it taught or suggested to include a delay and an adder arranged in this manner. Although the Examiner's comments address the element labeled "VCO 9" in *Olgaard*, the Applicants respectfully submit that a VCO (voltage-controlled oscillator) is not a "delay." It does not delay a signal of any type, and it by no means delays "one of the in-phase and quadrature phase components of the sampled signal," as recited in the amended claim. Rather, a VCO generates a signal having a frequency dependent upon its input voltage. (See Fig. 2 of *Olgaard*.) Likewise, although the Examiner points to the element in Fig. 2 of *Olgaard* labeled "+/- 45°," the Applicants respectfully submit that this element does not receive and add together the delayed and undelayed components of one of the in-phase and quadrature phase components of the sampled signal, as recited in the amended claim. Rather, the element labeled "+/- 45°" appears to be a phase-shifter that provides two versions of the VCO signal to the two multipliers of the mixer (10), one shifted upwards by 45° and the other shifted downwards by 45°. There is nothing in the disclosure of *Olgaard* that should lead one to believe this element is an "adder" that adds a delayed component to an un-delayed component. In addition, there is no delay element with an output feeding an input of this element.

In view of the foregoing, the Applicants respectfully submit that claim 1 would not have been obvious to a person of ordinary skill in the art and respectfully request reconsideration of this rejection. Claims 2 and 4 depend from claim 1 and are believed non-obvious for at least the same reason. With further regard to claim 4, the Applicants respectfully submit that nowhere in *Olgaard* is it taught or suggested to sample the output of a first filter at four times a second intermediate frequency. *Olgaard* does not disclose sampling frequencies at all, let alone any specific multiple of an intermediate frequency. For this additional reason, it is believed claim 4 would not have been obvious in view of *Olgaard*.

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Rejection of Claims 5, 6, 8 and 10 under 35 USC §102(e) – Olgaard

Claims 5, 6, 8 and 10 stand rejected under 35 U.S.C. § 102(e) as being anticipated by *Olgaard*. As the Examiner indicated that the subject matter of claim 11 would be allowable in independent form, the Applicants have amended independent claim 5 to incorporate the limitations of claim 11 and intervening claims, now canceled. Therefore, the Applicants respectfully submit that claim 5 and claims 6, 8 and 10, which depend from claim 5, are allowable.

Rejection of Claim 9 under 35 USC §103(a) – Olgaard in view of Belotserkovsky

Claim 9 stands rejected under 35 U.S.C. §103(a) as being unpatentable over *Olgaard* in view of *Belotserkovsky* (U.S. Patent No. 2003/0053571A1 to Belotserkovsky, et al.). As noted above, the Applicants have amended claim 5, from which claim 9 depends, in a manner that the Examiner indicated would render claim 5 allowable. Therefore, the Applicants respectfully submit that claim 9 is also allowable.

Rejection of Claims 31-38 under 35 USC §102(e) – Olgaard

Claims 31-38 stand rejected under 35 U.S.C. § 102(b) as being anticipated by *Olgaard*. The Applicants respectfully traverse this rejection.

The Applicants respectfully submit that *Olgaard* does not disclose, among other limitations, “digitizing the result signal, sampling at four times the intermediate frequency,” as recited in claim 31. The Examiner cites col. 2, lines 29-47 of *Olgaard* as disclosing this limitation. On lines 41-46, it is stated that “Mixer 14 typically mixes the output of converter 13 with a signal proportional to $\sin(\pi t/2T)$, where $1/T$ is equal to four times the second intermediate frequency” The Applicants respectfully submit that this statement relates to a mixing frequency, not a sampling frequency. Nothing in this statement implies there is an analog-to-digital converter that samples at four times the intermediate frequency. Sampling is what occurs in the digitizing step recited in claim 31. There is no digitizing or sampling in the mixer 14 disclosed in *Olgaard*. (There is an analog-to-digital converter 13, but it is not the element to which the phrase “four times the second intermediate frequency” is directed; rather, it is the mixer 14 to which this statement is directed.) The mixer 14 is merely mixing two signals, one of which has a

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frequency proportion to $\sin(\pi t/2T)$, where $1/T$ is equal to four times the second intermediate frequency. The only resemblance between this teaching and the limitation recited in claim 31 is the use of the phrase "four times the intermediate frequency." Apart from the coincidental use of that phrase, the digitizing step recited in claim 31 and the mixer 14 disclosed in *Olgaard* have no bearing on one another.

With regard to claim 34, the Applicants have amended this method claim in a manner similar to that in which they have amended apparatus claim 1, discussed above. Specifically, claims 36 and 37 have been canceled and the limitations thereof incorporated into claim 1, including the limitations regarding the addition of the undelayed and delayed signals. Therefore, claim 34 and claims 35 and 38, which depend from claim 34, are believed allowable for the same reasons discussed above with regard to claim 1.

In addition, there are limitations in dependent claims 35 and 38 that are not disclosed in *Olgaard* and therefore cannot be anticipated by *Olgaard*. For example, nowhere in *Olgaard* is it taught or suggested that "the intermediate frequency is about 15 MHz," as recited in claim 38.

In view of the foregoing, the Applicants respectfully submit that claim 31 is not anticipated by *Olgaard* and respectfully request reconsideration of this rejection. Claims 32-38 depend from claim 31 and are believed not to be anticipated for at least the same reason. Claims 35 and 38, which depend from claim 34, are also believed not anticipated for the reasons discussed above.

Rejection of Claim 48 under 35 USC §102(b) – Olgaard

Claim 48 stands rejected under 35 U.S.C. § 102(b) as being anticipated by *Olgaard*. The Applicants have amended independent claim 48, which comprises elements recited in means-plus-function format in accordance with the sixth paragraph of Section 112, to incorporate limitations similar to those in claim 1 and discussed above. Therefore, claim 48 is believed allowable for the same reasons discussed above with regard to claim 1. Moreover, as the elements of claim 48 are recited in means-plus-function format, their scope must be interpreted as meaning the corresponding structures disclosed in the specification plus equivalents thereof. The

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Applicants respectfully submit that, nuances of wording aside, these structures and their equivalents are not the same as the structures that *Olgaard* discloses. For example, as discussed above with regard to claim 1, the element labeled "+/-45°" in Figs. 1-2 of *Olgaard* is not an adder that adds a delayed and an undelayed component of one of the in-phase and quadrature phase components of the sampled signal. Rather, the element labeled "+/- 45°" appears to be a phase-shifter that provides two versions of the VCO signal to the two multipliers of the mixer (10), one shifted upwards by 45° and the other shifted downwards by 45°.

In view of the foregoing, the Applicants respectfully submit that claim 48 is not anticipated by *Olgaard* and respectfully request reconsideration of this rejection.

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CONCLUSION

In view of the foregoing, it is respectfully submitted that all pending claims are now in condition for allowance, and the Applicants respectfully solicit allowance of application. Should there be any further questions or concerns, the Examiner is urged to telephone the undersigned to expedite prosecution.

Respectfully submitted,
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